PATENT ABSTRACTS OF JAPAN

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(71)Applicant : NEC CORP

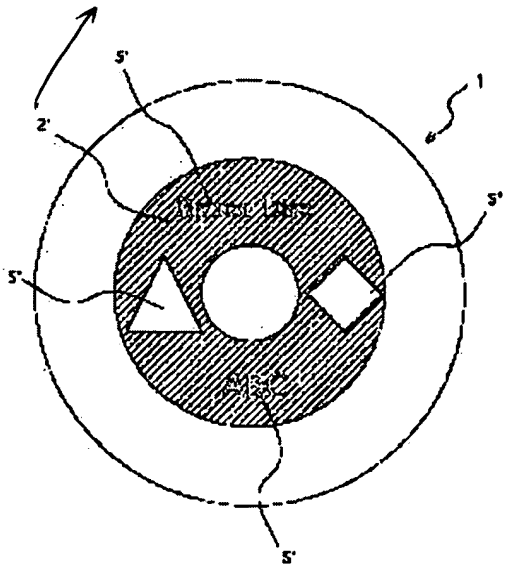
(72)Inventor : ISHIZUKA KENICHI
KATSUTA SHINICHI
ASAHARA KAZUHIKO

(54) OPTICAL DISK MEDIUM AND PRODUCTION THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To inexpensively and easily form a label using an exposed pattern by exposing a a groove or a pit pattern after a photoresist is coated on a prescribed area and moreover exposing an image becoming a lable on an area where the groove or the pit pattern is exposed.

SOLUTION: A groove or a pit exposing area is formed on an optical master disk 1 on the flatly ground disk shaped glass substrate of which a photoresist is uniformly coated by using an optical disk exposing device. Then, an image is provided on the groove or the pit exposing area by using a cineprojector in which a negative on which a prescribed image is previously formed, is loaded to expose the image. Then, a part corresponding to the image of the photoresist of the groove or the pit forming area is newly exposed and the image formed on the negative is exposed on the optical master disk 1. Thus, a groove or a pit forming area 2' and mirror finished surface parts 5' are formed by forming an exposed pattern while developing the photoresist on the disk 1.



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* NOTICES *

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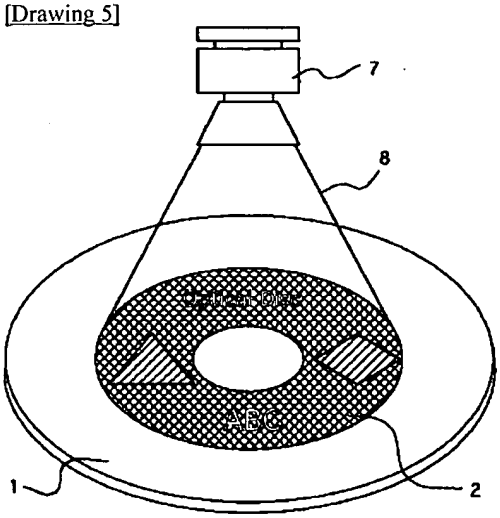
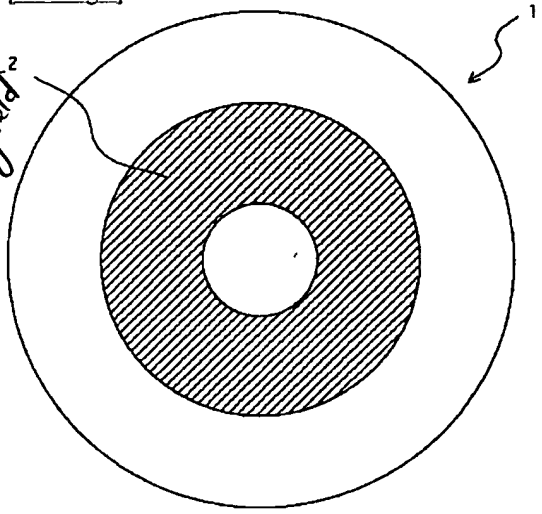
DRAWINGS

[Drawing 5]

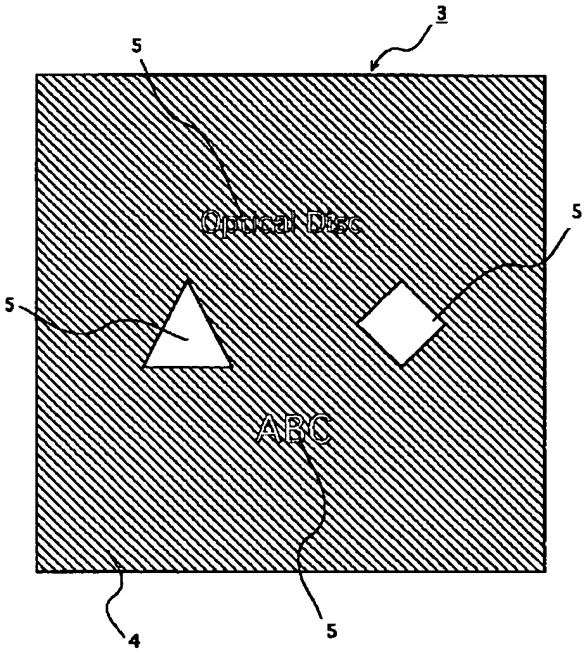


[Drawing 1]

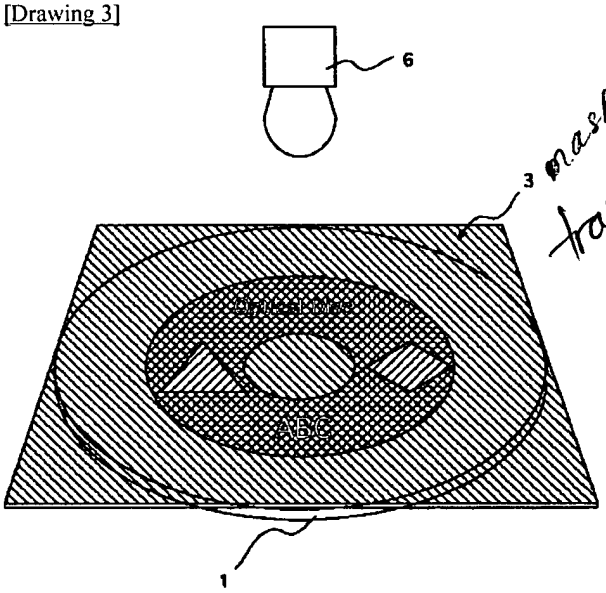


pit exposure field

[Drawing 2]

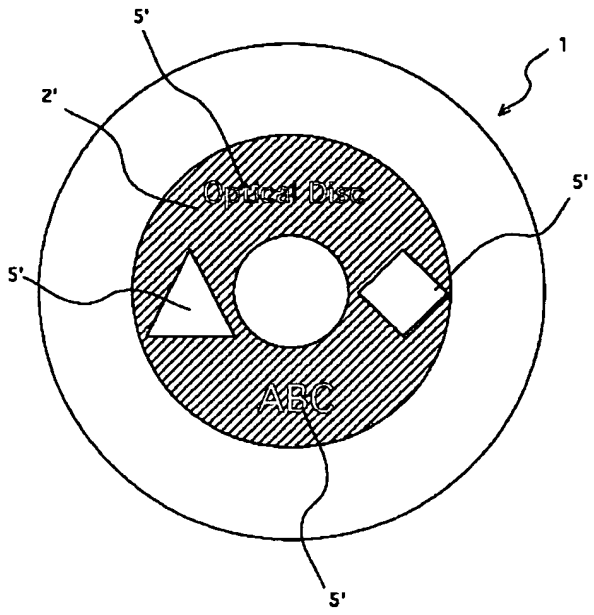


[Drawing 3]



mask
transparent and colorless film sheet

[Drawing 4]



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] Especially this invention relates to the reflective mold optical disk medium which stuck two optical disk substrates, and its manufacture approach about an optical disk medium and its manufacture approach.
[0002]
[Description of the Prior Art] Among the lamination mold optical disk media used for DVD etc., the piece flat-tapped layer type thing which performs informational read-out sticks the disk for data logging which recorded information data, and the dummy disk which does not have data, and consists of only one side. In such an optical disk, a label is formed on the dummy disk which does not usually have data. There is the approach of forming in a dummy disk side the image which can be recognized visually using the same approach as exposing the disk for data logging among the formation approaches of this label using the aligner of an optical disk besides the approach by printing.
[0003] An example of the approach of forming a label in an optical disk medium by such exposure is indicated by JP,10-11814,A. After this approach changes into r-theta information the alphabetic character and image which consist of X-Y information, it forms the field where whenever [reinforcement / of the reflective diffracted light / or angle of diffraction] differ, and he is trying to form the label which can be recognized by vision by forming a pit in addition to the part which corresponds to said alphabetic character and graphic form using the optical disk aligner used for exposure of the data signal of an optical disk.
[0004] Moreover, the approach of forming the image pattern used as a label is indicated by JP,8-287525,A by etching into an optical disk medium La Stampa which formed the pit used as a dummy, and the groove as other approaches of forming such a label.
[0005]
[Problem(s) to be Solved by the Invention] However, these label formation approaches have a translation process from X-Y information to the r-theta information which is not in the manufacture process of the usual optical disk, and the problem that the manufacture process of an optical disk becomes complicated since etching is needed. Moreover, since it is necessary to prepare signal transduction equipment and the etching system which were designed by dedication, it also has the problem that the production cost of an optical disk will become high.
[0006] This invention aims at offering the optical disk medium which formed DISUKUREBERU by exposure cheaply easily, and its manufacture approach in view of such a problem.
[0007]
[Means for Solving the Problem]
[0008] The manufacture approach of the optical disk medium concerning this invention is characterized by having the process which exposes a groove or a pit pattern after applying a photoresist to the predetermined field of an optical disk medium, and the process which exposes the image which serves as a label further to the field which exposed said groove or the pit pattern. The image in here is an image of the alphabetic character which can be recognized by vision, drawing, an encaustic pattern, or a photograph. Thus, if a desired image is further exposed to the field which exposed the groove or the pit pattern and it is made for the brightness of said groove or a pit pattern formation field, and a label image exposure field to differ, the image (label) which can be checked can be formed easily visually.
[0009] The process which exposes the image used as said label can put the mask in which the image was formed on said optical disk medium, and can realize it by irradiating the exposure light source over the mask concerned. In this case, the mask in which the image was formed can form drawing comparatively complicated as a label etc., if it has the transflective section which penetrates the protection-from-light section which interrupts the light which carried out outgoing radiation from said exposure light source, the transparency section which penetrates the light which carried out outgoing radiation from said exposure light source, and/or a part of light.
[0010] Moreover, the process which exposes the image used as said label can be acquired also by projecting the image formed on the photographic film on said optical disk medium using a projector.
[0011] Moreover, the optical disk medium concerning this invention is equipped with the groove or the pit formation field which comes to form a groove or a pit in the field which applied the photoresist to the label forming face, and the mirror plane field and/or the half-mirror plane field which exposed locally the field which applied said photoresist and obtained it, and said groove or a pit formation field, said mirror plane field, and/or a half-mirror plane field are characterized by to have specified the image in which visual recognition is possible as a whole.
[0012] Furthermore, said optical disk medium sticks the data disk which recorded data, and the dummy disk which does not have data, and is constituted, and it is desirable to form said image in said dummy disk side. If a label is formed in a dummy disk, as compared with forming a label in parts other than the data storage area of a data disk, a large label forming face can be taken and the part label can be designed freely.
[0013]
[Embodiment of the Invention] The gestalt of operation of this invention is explained below, referring to an attached drawing. Drawing 1 - drawing 3 are drawings showing the gestalt of implementation of the 1st of the manufacture approach of the optical disk medium concerning this invention. He is trying to form a label by using and exposing a mask to a dummy disk side with this 1st operation gestalt in DVD of the one layer type of one side which comes to stick the data disk which recorded information, and the dummy disk which does not have information.
[0014] First, as shown in drawing 1 , a photoresist is applied to the glass substrate of the disc form which ground the front face flat and

smooth at homogeneity, and the optical disk original recording 1 is created. A groove or the pit exposure field 2 is formed in the predetermined field of this optical disk original recording 1 using an optical disk aligner (not shown). This groove or the pit exposure field 2 can be formed in the field of the arbitration of the optical disk original recording 1, and can also determine that area as arbitration.
[0015] The mask 3 which, on the other hand, formed the image used as the label pattern of the optical disk original recording 1 concerned is prepared. Drawing 2 is drawing showing the mask 3 used by this example, and on the transparent and colorless film sheet, this mask 3 forms an image and consists of ink or metal thin films of protection-from-light nature etc. The mask 3 consists of the protection-from-light section 4 and the transparency section 5, and makes the shadow area of the transparency section 5 and others the protection-from-light section 4 for parts used as a label, such as an alphabetic character and drawing, in drawing 2 .
[0016] Next, as shown in drawing 3 , a mask 3 is carried on the optical disk original recording 1 in which the groove or the pit exposure field 2 was formed, and the photoresist on the optical disk original recording 1 is exposed throughout a period of this mask 3 using the light source 6. What has the wavelength and reinforcement which can expose said photoresist is used for the light source 6. Thereby, the photoresist under the transparency section 5 of a mask 3 newly exposes, and the image corresponding to the transparency section 5 is exposed.
[0017] If a mask 3 is removed, the photoresist on the optical disk original recording 1 is developed and an exposure pattern is made to form after these processes are completed, as shown in drawing 4 , groove or pit formation field 2' and mirror plane section (image) 5' will be formed in the optical disk original recording 1. Groove or pit field 2' corresponding to the protection-from-light section 4 which is a mask 3 shines with rainbow color by diffraction of light, and on the other hand, since brightness is low recognized as a mirror plane, partial 5' corresponding to the transparency section 5 of a mask 3 can check the whole visually as an image.
[0018] Subsequently, after creating La Stampa from the optical disk original recording 1 created as above-mentioned using a general optical disk manufacture process and creating an optical disk medium with injection molding, the optical disk medium which formed the label in the dummy disk side cheaply and easily is completed by forming the reflective film and sticking with the data disk prepared independently.
[0019] In addition, although an image part is formed as the transparency section 5 and the remaining part is made into the protection-from-light section 4 with the mask 3 used by this example, it is good only also considering the part which makes the transparency section the part which it leaves as a background to reverse, and serves as an image as the protection-from-light section. Moreover, when you need a halftone with the design of a label, it forms the transflective section in a mask 3. In this case, what is necessary is just to make it form two or more kinds of transflective sections from which permeability differs on a mask 3, when you need two or more sorts of halftones from which brightness differs. Furthermore, although he is trying to expose an image with a mask 3 with this operation gestalt after forming a groove or the pit exposure field 2 in the optical disk original recording which applied the photoresist, the sequence of these processes may be reverse.
[0020] Next, the manufacture approach of the optical disk medium applied to the 2nd operation gestalt of this invention with reference to drawing 1 , drawing 4 , and drawing 5 is explained. This example is also explained to a dummy disk side taking the case of the case where the label by exposure is formed, in one layer type DVD of one side of a lamination mold. First, as shown in drawing 1 , a groove or the pit exposure field 2 is formed in the optical disk original recording 1. That is, an optical disk aligner (not shown) is used for the glass substrate of the disc form ground flat and smooth at the optical disk original recording 1 which applied the photoresist to homogeneity, and a groove or the pit exposure field 2 is formed.
[0021] Subsequently, as shown in drawing 5 , a projector 7 is used for this groove or the pit exposure field 2, and an image is projected. This projector 7 is loaded with the negative which made the predetermined image (image used as a label) form in a photographic film beforehand. In addition, the projector 7 is equipped with the light source of the wavelength which can expose a photoresist, and reinforcement. This projector 7 and the optical disk original recording 1 are arranged so that it may counter mutually, scaling of the image projected if needed is carried out, and an image is exposed to the groove, the whole pit exposure field 2, or part formed in optical disk original recording. Thereby, a groove or the part corresponding to the image of the photoresist of the pit formation field 2 newly exposes, and the image formed in the negative is exposed on the optical disk original recording 1.
[0022] If the photoresist on the optical disk original recording 1 is developed and an exposure pattern is made to form after these processes are completed, as shown in drawing 4 , groove or pit formation field 2' and mirror plane section (image) 5' will be formed in the optical disk original recording 1. Since groove or pit field 2' shines with rainbow color by diffraction of light, partial 5' newly exposed as an image becomes a mirror plane mostly and brightness is recognized low, the whole can be visually checked as an image. Then, it is made to complete as an optical disk medium like the 1st operation gestalt using the production process of the conventional optical disk. In addition, sequence of the process which exposes an image may be made into reverse like the case of the 1st operation gestalt also with this operation gestalt with the process which forms a groove or the pit exposure field 2 in the optical disk original recording which applied the photoresist, and a mask 3.
[0023] Although explained by the case where any operation gestalt explained here forms a label in a dummy disk side in one layer type DVD of one side, the applicability of this invention is not restricted to this type of optical disk medium. For example, also in the optical disk medium of the one side two-layer type with which it is a double-sided data disk type, and read-out is performed only from one side, if a label is formed in the groove of the information data of one data disk, or range other than a pit exposure field, a label can be formed cheaply and easily using the approach of this invention.
[0024]
[Effect of the Invention] After forming a groove or a pit formation field, he is trying to form DISUKUREBERU by the manufacture approach of the optical disk medium of this invention by newly exposing an image for the mask or the photographic film in which the image was formed, to the groove concerned or a pit formation field using a projector, as explained above at the detail. Therefore, the label which used the exposure pattern cheaply easily can be formed, without stepping on the translation process from X-Y information to r-theta information, and complicated processes, such as etching.

[Translation done.]